Neonotonia wightii as an alternative host for halo-blight of beans in Africa: assessment of disease spread under semi-natural conditions.

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Host range studies at HRI, Wellesbourne, UK, have shown that *Neonotonia wightii* is a common non-*Phaseolus* host of the halo-blight pathogen *Pseudomonas syringae* pv. *phaseolicola*. *N. wightii* is a widely distributed leguminous weed in Africa which commonly occurs growing in and around farmer's fields. It was found to be the natural host of seven isolates, belonging to three of the nine races now recognised (Taylor *et al.*, in press). Furthermore, artificial inoculation showed that it can be infected with six of the races, causing maximum expression of halo-blight symptoms (Teverson, 1991). It has been suggested (Mabagala and Saettler, 1992) that *N. wightii* may act as a perennial reservoir of the halo-blight bacterium. The aim of this study was to determine whether natural spread by rain splash can indeed lead to transmission of the pathogen from infected *N. wightii* to the susceptible bean cultivar Canadian Wonder under Tanzanian field conditions.

Canadian Wonder seeds were pre-germinated on moist filter paper in closed plastic containers at ambient temperature. Seeds were checked for water uptake after 24 h. Seed coats of those which remained hard were chipped with a scalpel. After a further 24 h seeds were sown, 2 per 6.5cm plastic pot, in a sterilised 1:1 loam : sand mixture. After emergence, seedlings were thinned to one per pot. When the primary leaves had just expanded, Canadian Wonder plants were transferred from the screenhouse and set out in the experimental plots at intervals of 1.5 x 3.5 m.

The experimental plot, in amenity grassland at Selian Research Institute, Arusha, Tanzania, contained a high proportion of halo-blight infected plants of *N. wightii*, whereas the control plot was devoid of the legume. Plots were separated by several metres and a gravel driveway.

Thirty two plants were set out in each plot on May 5 1992. Recordings were made on 13 and 19 May and 10 July, at 8, 14 and 36 days after first exposure (AE) on 5 May. Halo-blight infection was scored on a 5 point scale as previously defined (Teverson, 1991) where grade 1 is resistant and grade 5 maximally susceptible. Plants were watered as required and fed once with a compound fertilizer.

Samples of infected *N. wightii* and *P. vulgaris* were sent to HRI, Wellesbourne, for isolation and race typing of the pathogen.

At the first recording (8 days AE) one Canadian Wonder plant showed halo-blight infection on the primary leaves, which at the second recording (14 days AE) was graded 4 on a 1-5 scale. At the third recording, (36 days AE) infection had spread to the trifoliate leaves and

the plant was stunted and dying. A second plant showed grade 2 symptoms at 14 days AE, but no further spread was recorded. No other plant in the experimental plot showed symptoms of halo-blight and none of the plants in the control plot showed halo-blight symptoms.

Race typing of isolates derived from samples of both infected *N. wightii* and *P. vulgaris* cv. Canadian Wonder showed that each infection was due to race 7 of the pathogen.

Halo-blight was shown to be transmitted from *Neonotonia wightii* to susceptible *P. vulgaris* plants under semi-natural conditions in Tanzania. This adds further weight to evidence from both disease isolations and artificial inoculations which suggest that *N. wightii* is an alternative perennial host for halo-blight in Africa. Race typing of pv. *phaseolicola* isolates showed that infections of both species were due to race 7, suggesting that infection of *P. vulgaris* was due to direct spread from *N. wightii*. It also showed that this particular race of the pathogen was not restricted to one host. *N. wightii* is a common and widely distributed leguminous weed; this study suggests that it is an important source of halo-blight infection from direct transmission under semi-natural conditions in Tanzania.

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